

E1
17. (Thrice Amended) A non-naturally occurring composition of matter comprising a protein complex possessing nucleic acid polymerase enhancing activity, the complex comprising a plurality of subunits wherein at least one subunit is a *P. furiosus* protein selected from at least one of:

a protein encoded by a nucleic acid having the nucleotide sequence of SEQ ID NO: 70 or a nucleic acid that hybridizes to the complement of the nucleic acid having the nucleotide sequence of SEQ ID NO: 70, wherein the hybridization conditions comprise incubation in 5x SSC and 50% formamide at 42°C, and washing in 0.1x SSC and 0.1% sodium dodecyl sulfate at 60°C; and

a protein having a sequence of amino acids comprising the amino acid sequence of SEQ ID NO:71.

E2
46. (Amended) An antibody that binds to a protein having an amino acid sequence comprising at least one of SEQ ID NO: 19 and 71.

E3
59. (Thrice Amended) A protein produced from a cell containing a DNA construct comprising a sequence encoding the amino acid sequence of SEQ ID NO: 71 operably linked to an expression vector, wherein the protein is in monomeric, dimeric, or multimeric form.

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E4
60. (Amended) The protein of claim 59, wherein the cell is a bacterial cell.

- 4*
E
cont
61. (Amended) A polymerase-enhancing complex comprising the protein of claim 59.
 62. (Amended) An antibody that binds to the protein of claim 59.
 63. (Amended) An antibody that binds to a protein comprising the amino acid sequence of SEQ ID NO: 71, wherein the protein is part of the polymerase-enhancing complex of claim 61.
 64. (Amended) The protein of claim 59, wherein the protein is produced as a fusion protein.
 65. (Amended) The protein of claim 64, wherein the fusion protein comprises a calmodulin binding peptide.
 66. (Amended) The protein of claim 65, wherein the expression vector is pCAL-n-EK.

- 5*
77. (Amended) A non-naturally occurring composition of matter comprising a protein comprising the amino acid sequence of SEQ ID NO: 71.

E5

78. (Amended) The composition of matter of claim 77, wherein the protein is in monomeric, dimeric, or multimeric form.

E6

79. (Amended) The composition of matter of claim 77, wherein the protein is present in a protein complex.

E7

80. (Amended) The composition of matter of claim 77, wherein the protein is an analog protein.

E8

85. (Twice Amended) A protein having polymerase-enhancing factor (PEF) activity comprising the amino acid sequence of SEQ ID NO: 73.

E9

90. (Amended) A protein extract of claim 87, which comprises a protein that can be bound by an antibody specific for a recombinant Pfu protein comprising the amino acid sequence of SEQ ID NO: 71.

E10

95. (Thrice Amended) A non-naturally occurring composition of matter comprising a polymerase-enhancing protein encoded by a nucleic acid that hybridizes to the complement of the nucleotide sequence of SEQ ID NO: 70, wherein the

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hybridization conditions comprise incubation in 5x SSC and 50% formamide at 42°C, and washing in 0.1x SSC and 0.1% sodium dodecyl sulfate at 60°C overnight.

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